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16. Abstract (MAXIMUM 200 WORDS) The need to reduce and manage energy and fuel in the Coast Guard was promulgated in Commandant Instruction 4100.2D, dated 6 March 1997. The Coast Guard is required by law to reduce its overall energy consumption and to minimize the use of petroleum fuel in all its facilities and platforms. The Coast Guard Energy Program Director recognizes the need to introduce future low-cost and proven engineering retrofit changes to the fleet that could help meet these goals. Second to personnel costs, fuel is the single largest expense associated with cutter operations. The Coast Guard Headquarters sponsor, Office of Naval Engineering (G-SEN), requested testing and evaluation of an electronic engine speed pilot on a WMEC-270. The sponsor desired testing of a system that would optimize propeller pitch in addition to engine speed on a controllable pitch propeller, since this was the configuration of most of the Coast Guard's large cutters. Although speed pilots have been in use for several years with crew boats and ferries, the ability to control propeller pitch in addition to engine speed was something relatively new. A sea trial was performed from 24 through 26 August on the CGC TAMPA to test an electronic engine speed pilot (ESP) system under actual operating loads and sea conditions. A fuel savings of 10% was measured for the standard engine RPM/propeller pitch settings tested using the throttle and pitch automatic control mode. Some of the ESP features did not work and require more development, i.e., best speed and automatic throttle control modes. Measurements from an independent and highly accurate positive displacement fuel meter tracked well with the derived fuel from the ESP. A description of the electronic engine speed pilot system, data analysis, and recommendations are presented. In addition, a high-level fuel savings projection was performed.			
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EXECUTIVE SUMMARY

The need to reduce and manage energy and fuel in the Coast Guard was promulgated in Commandant Instruction 4100.2D dated 6 March 1997. The Coast Guard is required by law to reduce its overall energy consumption and to minimize the use of petroleum fuel in all its facilities and platforms, i.e., cutters. The Coast Guard Energy Program Director, Commandant (G-CFP), listed as an energy goal the reduction of operational costs by at least 3% in FY97 from the established energy baselines. Commandant (G-CFP) recognized the need to introduce future low-cost proven engineering retrofit changes to the fleet to help meet these goals. Second to personnel costs, fuel is the single largest expense associated with cutter operations.

The sponsor, U.S. Coast Guard Headquarters Office of Naval Engineering (G-SEN), requested testing and evaluation of an electronic engine speed pilot on a WMEC-270. The sponsor desired testing of a system that would optimize propeller pitch in addition to engine speed on a controllable pitch propeller, since this was the configuration of most of the Coast Guard's large cutters. Although rpm speed pilots have been in use for several years with crew boats and ferries, the ability to control propeller pitch in addition to engine speed was something new.

A sea trial to test an electronic engine speed pilot (ESP) system under actual operating loads and sea conditions was performed on the CGC TAMPA from 24-26 August 1998. A fuel savings of 10% was measured for the standard ERPM/propeller pitch settings tested using the throttle/pitch automatic control mode. Some of the ESP features did not work and require more development, i.e., best speed and throttle automatic control modes. The independent fuel meter measurements tracked well with the derived fuel from the ESP. A description of the electronic engine speed pilot system, data analysis, and recommendations are presented. In addition, a high-level fuel savings projection was performed.